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ABSTRACT

Participants in CHOICES, a computerized career information program, were 40 female and 9 male freshmen psychology students at the University of Missouri at Columbia. After 4 weeks of program work, a questionnaire to assess a broad range of career-related concerns was administered to the participants and to a quasi-control group of 19 female and 7 male students who had not participated in the program. The goal of the study was to analyze the effect of CHOICES on perceived career concerns of the students and to evaluate user response to the system. Analysis of questionnaire findings and student comments showed that, overall, students reacted positively to their experiences. Gaining self-information and career information were rated more highly than assistance with decision making. This indicates the use of CHOICES for those students in the developmental stage called "exploration." The use of CHOICES resulted in a reduced degree of career concerns in a group reporting a high level of career anxiety. Perhaps reflective of economic conditions, students are eager for career information. The computer allows an interesting and non-threatening outlet for the expression of career-related uncertainty. Responses indicated that students do not walk away from CHOICES with a "magic answer" but report a moderation of concern on variables relating to self-information, career exploration, marketability, motivation, and decision making. (KC)

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CHOICES: Evaluation and Analysis
of Effect on Career Concerns

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METHOD

Participants were students from introductory psychology sections at the University of Missouri-Columbia. A researcher administered a questionnaire to six class sections during the Fall semester to all interested students. The students were consequently informed that a new computerized career information system was being tested and that volunteers could obtain research credit by signing up at the Career Planning and Placement Center. The first 50 interested students were allowed to sign up for the available computer time slots. Twenty-seven non-volunteers were re-administered the questionnaire after four weeks to form a quasi-control group. Over 90% of the participants were freshmen. In the experimental group were 40 women and 9 men, while the control group consisted of 19 women and 7 men. The imbalance in the male/female ratio reflected the enrollment of the sections.

The questionnaire, developed for this study to measure a broad range of career-related concerns, included 40 items. The items were formulated into straightforward, growth-oriented statements (eg. I want to identify what skills and abilities I have.) based upon Campbell and Cellini's (1979) taxonomy of career concerns. The checklist represented a large degree of trust in the students' own direct identification of their career needs as opposed to reliance upon an instrument that would rarely be given the typical career information seeker. The responses to the statements were recorded on a 5-point Likert Scale (1 = of no concern to 5 = of great concern). Also given was an evaluation form to the experimental group for their perceptions of and satisfaction ratings on CHOICES.

PURPOSE FOR PARTICIPATING IN EXPERIMENT

On the evaluation questionnaire, 46% of users stated that their main goal in using CHOICES was to choose a major or decide about careers. Seventeen percent indicated the need to learn about values, 12% marked getting course credit as their reason, 10% wanted to decide which courses to take, and 15% indicated other reasons.

GENERAL RESPONSES TO INTERACTING WITH COMPUTERIZED CAREER INFORMATION SYSTEM

For 59% of the students, CHOICES was the first exposure to the use of computers. Nearly two-thirds of the users described their feelings about using a computer as "favorable", one-third felt "neutral", and one person indicated an "unfavorable" reaction. When asked for a specific reaction to CHOICES, the responses were 80% as favorable, 14% neutral, and 6% unfavorable. Sixty-eight percent felt that they would profit from further use of the program. Though the general reaction was positive, 86% indicated plans to do further career exploration. Students apparently did not leave the program thinking that CHOICES has calculated the "magic" career.

CRITICISMS AND SUGGESTIONS FOR IMPROVEMENTS

The researcher had an a priori concern about the students' willingness to complete the 79 page guidebook which preceded the actual computer usage. In reality, only 20% of the users indicated any problems with the guidebook. Not having access to the master list of occupational clusters was cited most often. Four students found the terminology unclear and three students mentioned repetitiousness as a problem. From anecdotal information, it appeared that students

often resorted to skimming of instructions in order to avoid the introductory passages for each topic.

Another section of the evaluation had a checklist for problems encountered in the manipulation of the program on-line. Twenty-one students were bored while the computer was processing information. It is noted that an updated version of disks has significantly reduced the amount of lag time. Fourteen students did not understand some of the on-screen directions. As the program is presently written, some entry errors are easily made and error statements are not specific enough to be of much benefit. Two students each indicated eye strain and excess of script on the screen as problems. It is the researcher's recommendation that a resource person, preferably a counselor, familiar with the operation of the program be available to the user. This assistance is especially important at the beginning of the program to help the user become "friendly" with the computer.

When asked to comment upon completeness of career information, approximately 20% of the users wanted either more information on listed occupations or else did not find information on particular occupations available. Generally, this reflected some students' desire for information on specializations within certain occupational areas. This may reflect the professional career aspirations of UMC students.

The last section of the evaluation asked for general comments to help others in using CHOICES. The most common request was for an explanation of the sort process used to generate the matched list of occupations in the Explore route. The program presents an option for users to see why an occupation was not listed; however, some students either were not satisfied by or disagreed with the explanation. Relatedly, several students felt that the exclusion criteria was too

restrictive. These "disagreements" with the computer could also be interpreted favorably. Users may be encountering limitations based in reality and the frustration of the student could provide the basis for fruitful intervention by a career counselor. Nonetheless, the counselor should have complete familiarity with the sort process used by CHOICES as explained in the counselor's manual.

Several more particular suggestions were offered. Definition of an occupational "cluster" could be more clearly made. The wording between the guidebook, profile, and computer could be more precise. Expansion of the number and specificity of occupational information would be useful, especially for the more professional level careers. Since the Explore topics on Interests and Temperments were often picked by students for priority consideration, some warning about how quickly preferences on these topics eliminate occupations should be made. Again, the productive use of CHOICES would be facilitated by having a knowledgeable resource person available at all times.

Though not specifically mentioned in the evaluations, some other suggestions can be offered after observation of over 50 participants. On the Profile sheet, labelling of appropriate numerical values to be entered into the computer could be more clear. For example, the temperments topic on the profile sheets puts characteristics into four levels, ie. "must have", "like to have", "refuse to have", and "prefer to avoid." The computer's sorting process, however, allows only two levels, ie. "must have" vs. "refuse to have" without informing the user accordingly. Also, the definitions given for the temperments are sketchy and potentially misleading. They could be improved by including definitions from the counselor's manual. In the Explore section, users need better instructions about what to do when zero

clusters are reached. For example, "Your topic specifications appear too strigent. Would you like to go back and change some of them?" When the user does choose to make a change on topic specifications, it would be useful if the previous choices were displayed as a reminder. An oversight is that Topic 14, Training Required, is not part of the Explore route on the micro version. This causes an ambiguous error message when the user enters 14 as one of the Topics to consider in Explore.

In the Related route, the directions need to include a limit on the number of topics that Related can handle when first entering the route. Though the limitations are described in the guidebook, a reminder on the screen would be very helpful. Also in Related, the menu will switch the order of choice options for no apparent reason. For example, in one menu, "Change base clusters" will be option #1, then, in the next menu, it becomes option #2. This can be a problem for the less than diligent reader.

FAVORABLE IMPRESSIONS OF THE SYSTEMS

Though no specific requests for positive feedback were written on the evaluation, through comments and anecdotal data, the following represent some of the supportive reactions: "...better, more helpful than expected..."; "...would recommend to a friend"; "...should offer this to more freshmen. It would help them match their personalities to job requirements"; "I enjoyed it"; "...pleased overall"; "... (CHOICES) made me be more realistic than idealistic"; "The workbook (guidebook) really made me think"; "...discovered specific requirements for different jobs". These comments support the favorable overall ratings mentioned earlier. More specific satisfaction ratings were gathered from each user on the evaluation.

PERCEIVED UTILITY OF THE EXPLORE ROUTE

Mean ratings and standard deviations on each satisfaction item were computed (see Table 1). The items are listed in order of descending mean scores. This was not the order of appearance on the actual evaluation form. Students were eager to volunteer for the research and their interest was maintained after using the system (see Item 1). Despite some of the feedback on Explore, clarity of information (Item 2) was rated highly. The next highest ratings support some basic goals of the Explore route. Users were considerably satisfied with the usefulness of the career information (Item 3) and with the facilitation of the person-job match-up (Item 4). A more moderate degree of satisfaction was reported on Items 5 to 7. None of these results are surprising in light of the stated goals of the Explore section.

On items rated with less relative satisfaction, there is perhaps a trend which could be informative. The lowest satisfaction scores are on items which relate to decisions, either in terms of process or actual deciding (see Items 9, 10, 12, 13). It could be easily argued that Item 11, resolving conflicts about occupational choice, is also a decisional question.

Combining results of "high" and "low" items leads to an hypothesis. On a self-report basis, CHOICES' Explore route is most effective in helping users gain information about themselves, careers, and how these two entities fit together. It is apparently not as effective in the actual selection of career direction. In other words, the Explore route addresses the question, "Who am I in relation to the career world?". The next question, "What do I do with this new information?" is not so well answered.

Given that CHOICE purports to be a career information and not a career guidance system, the satisfaction results are as expected. The implication for the counseling situation is that a follow-up counseling session is important.

PERCEIVED UTILITY OF EXPLORE ROUTE BY GROUP

When broken into groups by sex, females were more satisfied overall, though not significantly. On two individual items, however, sex differences were significant at the .05 level. Males were less satisfied with Explore's help in choosing an occupation for which to prepare (Item 9) and in exploring occupations which fit with self-information (Item 4). It should be noted that males were poorly represented in the sample (9 of 49). Also, when satisfaction was correlated with previous use of a computer, r was less than .01. When subjects were divided into groups according to their stated purpose for using CHOICES, those wanting to choose a major had the highest mean satisfaction ($\bar{x} = 3.9$). Those stating a desire to choose a career, assess their values, or just get credit for the experiment reported approximately the same mean satisfaction ($\bar{x} = 3.4-3.5$). Only the group stating miscellaneous "other reasons" for using CHOICES rated satisfaction lower ($\bar{x} = 2.8$).

EFFECT OF CHOICES ON DEGREE OF CAREER CONCERN

Both the user/experimental and non-user/control groups were given a pre- and post-measure consisting of 40 items expressing common career concerns. It was expected that those in the experimental group would express less anxiety about their career issues than the control group on the post test. When results of the dependent T-tests were observed, the expectation was substantiated. In the experimental group, 21 of 40

items (see Table 2) yielded a p-value of .05 or lower. All of these 21 showed lowered post-test scores. For the control group, only three items showed a significant change at a .05 level (see Table 3). Items 6 and 30 had lower post-test scores while Item 23 had a significantly higher post-test score. Group averages on the checklist as a whole are found in Table 4. It appears that CHOICES had an impact on a large number of career concerns based on self-report. Since so many items showed significance, further treatment of data was indicated, including factor analysis of the Career Concerns Checklist.

FACTOR ANALYSIS OF THE CAREER CONCERNS CHECKLIST

The checklist was designed as an exploratory instrument hoping to represent a broad spectrum of concerns that students theoretically encounter in their career thinking. Two factor analyses were performed in an attempt to identify commonalities in dimensions within the variables. First the pre-test scores of both groups were treated, then the post-test scores of the experimental group. In both analyses the matrices of product-moment correlations were treated by principal components solutions. Those factors with eigenvalues greater than 1.0 were retained and rotated to simple structure using varimax criteria.

The two factor analyses revealed some commonality of structure between pre-and post-measurements. From the 40 item checklist, ten factors were extracted from the pre-test and nine factors from the post-test were retained. There was commonality for six factors. These were career marketability immediacy of career decision, obtaining work experience, entry to graduate/professional school, conflict in career interest with significant others, and self-assessment for decision-making. There were four independent factors on the pre-test including obtaining general career/major information,

implementation of present career choice, doubting ability to reach a career goal, and lacking motivation for exploration. The independent post-test factors were degree of effort for exploration, obtaining specific information on career preference, and receiving career counseling.

The changes in extracted factors indicate that the career issues for CHOICES users were altered as a result of their experience. In particular, self-assessment for decision-making accounted for 6.3% of the variance on the pre-test, and 27.4% on the post-test. From the standpoint of many career theorists, that factor loading change is positive. In addition, the independent factors are deficit-based dimensions on the pre-test (eg. doubting ability, lack of motivation) while the post-test's independent factors reflect a problem-solving orientation (eg. degree of effort for exploration, receiving career counseling).

DISCUSSION

The primary goals of the study were to 1) analyze the effect of CHOICES on perceived career concern of university freshmen and 2) evaluate user response to the system. Overall, students reacted positively to their experience. Gaining self-information and career information were rated more highly than assistance with decision-making. This indicates the use of CHOICES for those students in the developmental stage that Tiedeman (1963) describes as Exploration. The factor analysis data supports this conclusion, based upon the increased amount of variance accounted for by the self-assessment dimension on the post-test of CHOICES users.

The use of CHOICES resulted in a reduced degree of career concern in a group reporting a high level of career anxiety. Perhaps reflective of economic conditions, students are eager for career information. The computer allows an interesting and non-threatening outlet for the expression of career-related uncertainty. Responses indicated that students do not walk away from CHOICES with a "magic answer" and report a moderation of concern on variables relating to self-information, career exploration, marketability, motivation, and decision-making.

TABLE 1

1= not at all
 2= somewhat
 3= moderately
 4= considerably
 5= greatly

SATISFACTION WITH CHOICES EXPLORE ROUTE

<u>X</u>	<u>SD</u>					
4.1	.9	1.	How interesting was the Explore route to you?	1	2	3 4 5
4.0	.9	2.	How clear was the Explore route in giving information?	1	2	3 4 5
HOW USEFUL WAS THE EXPLORE ROUTE IN:						
3.0	.6	3.	providing useful career information?	1	2	3 4 5
3.9	1.0	4.	helping you explore which occupations might fit the information about yourself?	1	2	3 4 5
3.6	.9	5.	showing you the relationship between self-information and career decisions?	1	2	3 4 5
3.5	1.0	6.	helping you become more aware of your values?	1	2	3 4 5
3.8	1.0	7.	helping you clarify the rewards and satisfactions you seek in an occupation?	1	2	3 4 5
3.2	1.1	8.	helping you confirm a career choice that you had already made?	1	2	3 4 5
3.1	1.1	9.	helping you choose which occupation to prepare for?	1	2	3 4 5
3.0	1.0	10.	helping you learn how to make career decisions?	1	2	3 4 5
3.0	1.2	11.	resolving conflicts about occupational choice?	1	2	3 4 5
3.0	1.3	12.	helping you choose a major (academic program) to pursue?	1	2	3 4 5
2.9	1.0	13.	helping you in learning a strategy for making decisions?	1	2	3 4 5

TABLE 2

EXPERIMENTAL GROUP:
Pre - Post Comparisons on Dependent T-Test
(n = 49)

1=no concern
2=slight concern
3=moderate concern
4=considerable concern
5=great concern

CAREER CONCERNS CHECKLIST

INFORMATION ABOUT ONESELF

I want to:

**1.	identify what skills and abilities I have.	1	2	3	4	5
*2.	clarify what career values are most important to me.	1	2	3	4	5
*3.	sort out what careers interest me the most.	1	2	3	4	5
**4.	sort out what majors interest me the most.	1	2	3	4	5
**5.	know how much time and effort I should put into career decision-making.	1	2	3	4	5
***6.	be as certain about my future as my friends seem to be about theirs.	1	2	3	4	5
***7.	find out how to be more motivated to do career exploration.	1	2	3	4	5
***8.	discover the type of work environment that I could perform well in.	1	2	3	4	5

INFORMATION ABOUT WORK/EDUCATIONAL WORLD

*9.	find out how my personal characteristics (eg. interests, skills, abilities, values, etc.) relate to possible majors and/or careers.	1	2	3	4	5
**10.	explore career areas related to a particular major.	1	2	3	4	5
11.	learn how to organize information on possible careers and/or majors	1	2	3	4	5
*12.	gather information about actual tasks and job requirements in various careers.	1	2	3	4	5
**13.	find out how marketable a particular degree is likely to be.	1	2	3	4	5
*14.	learn how to get work experience in a field while still in school.	1	2	3	4	5
*15.	sort out confusing or contradictory career information.	1	2	3	4	5
16.	receive more accurate career information.	1	2	3	4	5
*17.	handle disappointing information about a major and/or career.	1	2	3	4	5
18.	learn more about career paths within various career areas.	1	2	3	4	5
19.	know more about the economics of various careers.	1	2	3	4	5
*20.	assess the chances of getting a job within a chosen career field.	1	2	3	4	5

INFORMATION ABOUT CAREER DECISION-MAKING

21.	learn how to choose a satisfying career and/or major.	1	2	3	4	5
22.	know how to have a clearer sense of career direction.	1	2	3	4	5
23.	know how to select specialized or graduate/professional training for my career field.	1	2	3	4	5
**24.	learn the steps for decision-making.	1	2	3	4	5
25.	have a computer and/or counselor make career decisions for me.	1	2	3	4	5
26.	learn how to narrow down career options.	1	2	3	4	5
***27.	overcome the feeling that personal limitations are preventing my consideration of many attractive career options.	1	2	3	4	5
*28.	gain more confidence in my ability to succeed in a chosen career field.	1	2	3	4	5
29.	avoid the feeling of being 'locked in' to a possible bad choice if a career decision were made now.	1	2	3	4	5
30.	have personal career expectations match my parents' expectations.	1	2	3	4	5
31.	have my parents understand why their career expectations aren't right for me.	1	2	3	4	5
32.	make a career decision immediately.	1	2	3	4	5
33.	choose a major immediately.	1	2	3	4	5
34.	reaffirm that a chosen career and/or major is appropriate for me.	1	2	3	4	5
35.	know how to defend a particular career/major choice to others.	1	2	3	4	5

INFORMATION ABOUT PLANNING

36.	learn the courses, training and or experiences which would best prepare me for a chosen career.	1	2	3	4	5
*37.	gain more awareness of future employment trends which may affect a chosen career.	1	2	3	4	5
*38.	become more motivated to act upon the career decisions that I've already made.	1	2	3	4	5
39.	gain more knowledge about how to get a job once a career is chosen.	1	2	3	4	5
40.	find out how my preparation and background matches with the entry requirements for graduate/professional schools.	1	2	3	4	5

* = $p < .05$

** = $p < .01$

*** = $p < .001$

TABLE 3

CONTROL GROUP:
Pre - Post Comparisons on Dependent T-test
(n = 27)

1=no concern
2=slight concern
3=moderate concern
4=considerable concern
5=great concern

CAREER CONCERNS CHECKLIST

INFORMATION ABOUT ONESELF

I want to:

- | | | | | | |
|--|---|---|---|---|---|
| 1. identify what skills and abilities I have. | 1 | 2 | 3 | 4 | 5 |
| 2. clarify what career values are most important to me. | 1 | 2 | 3 | 4 | 5 |
| 3. sort out what careers interest me the most. | 1 | 2 | 3 | 4 | 5 |
| 4. sort out what majors interest me the most. | 1 | 2 | 3 | 4 | 5 |
| 5. know how much time and effort I should put into career decision-making. | 1 | 2 | 3 | 4 | 5 |
| *6. be as certain about my future as my friends seem to be about theirs. | 1 | 2 | 3 | 4 | 5 |
| 7. find out how to be more motivated to do career exploration. | 1 | 2 | 3 | 4 | 5 |
| 8. discover the type of work environment that I could perform well in. | 1 | 2 | 3 | 4 | 5 |

INFORMATION ABOUT WORK/EDUCATIONAL WORLD

- | | | | | | |
|--|---|---|---|---|---|
| 9. find out how my personal characteristics (eg. interests, skills, abilities, values, etc.) relate to possible majors and/or careers. | 1 | 2 | 3 | 4 | 5 |
| 10. explore career areas related to a particular major. | 1 | 2 | 3 | 4 | 5 |
| 11. learn how to organize information on possible careers and/or majors | 1 | 2 | 3 | 4 | 5 |
| 12. gather information about actual tasks and job requirements in various careers. | 1 | 2 | 3 | 4 | 5 |
| 13. find out how marketable a particular degree is likely to be. | 1 | 2 | 3 | 4 | 5 |
| 14. learn how to get work experience in a field while still in school. | 1 | 2 | 3 | 4 | 5 |
| 15. sort out confusing or contradictory career information. | 1 | 2 | 3 | 4 | 5 |
| 16. receive more accurate career information. | 1 | 2 | 3 | 4 | 5 |
| 17. handle disappointing information about a major and/or career. | 1 | 2 | 3 | 4 | 5 |
| 18. learn more about career paths within various career areas. | 1 | 2 | 3 | 4 | 5 |
| 19. know more about the economics of various careers. | 1 | 2 | 3 | 4 | 5 |
| 20. assess the chances of getting a job within a chosen career field. | 1 | 2 | 3 | 4 | 5 |

INFORMATION ABOUT CAREER DECISION-MAKING

21.	learn how to choose a satisfying career and/or major.	1	2	3	4	5
22.	know how to have a clearer sense of career direction.	1	2	3	4	5
*23.	know how to select specialized or graduate/professional training for my career field.	1	2	3	4	5
24.	learn the steps for decision-making.	1	2	3	4	5
25.	have a computer and/or counselor make career decisions for me.	1	2	3	4	5
26.	learn how to narrow down career options.	1	2	3	4	5
27.	overcome the feeling that personal limitations are preventing my consideration of many attractive career options.	1	2	3	4	5
28.	gain more confidence in my ability to succeed in a chosen career field.	1	2	3	4	5
29.	avoid the feeling of being 'locked in' to a possible bad choice if a career decision were made now.	1	2	3	4	5
*30.	have personal career expectations match my parents' expectations.	1	2	3	4	5
31.	have my parents understand why their career expectations aren't right for me.	1	2	3	4	5
32.	make a career decision immediately.	1	2	3	4	5
33.	choose a major immediately.	1	2	3	4	5
34.	reaffirm that a chosen career and/or major is appropriate for me.	1	2	3	4	5
35.	know how to defend a particular career/major choice to others.	1	2	3	4	5

INFORMATION ABOUT PLANNING

36.	learn the courses, training and or experiences which would best prepare me for a chosen career.	1	2	3	4	5
37.	gain more awareness of future employment trends which may affect a chosen career.	1	2	3	4	5
38.	become more motivated to act upon the career decisions that I've already made.	1	2	3	4	5
39.	gain more knowledge about how to get a job once a career is chosen.	1	2	3	4	5
40.	find out how my preparation and background matches with the entry requirements for graduate/professional schools.	1	2	3	4	5

* = $p < .05$